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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,470	03/25/2004	Tatsunori Kanai	251117US2SRD	6293

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
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ALEXANDRIA, VA 22314

EXAMINER

TANG, KENNETH

ART UNIT	PAPER NUMBER
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2195

NOTIFICATION DATE	DELIVERY MODE
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08/18/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/808,470	Applicant(s) KANAI ET AL.	
	Examiner KENNETH TANG	Art Unit 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-6,9,10,12,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,9,10,15 and 16 is/are rejected.
- 7) ☒ Claim(s) 5 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-2, 4-6, 9-10, 12, and 15-16 are presented for examination.
2. This action is in response to the Amendment on 5/26/09. Applicant's arguments have been fully considered but are moot in view of the new grounds of rejections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 4, 6, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri (US 5,745,778) in view of Strout, II et al. (hereinafter Strout) (US 5,339,415), and further in view of Saito et al. (hereinafter Saito) (US 5,887,143).**

4. As to claim 1, Alfieri teaches a method of assigning a plurality of threads to a plurality of processors, each of the threads being a unit of execution of a real-time operation (see Abstract, Fig. 2, items 210-214, 220-223, 230-233, Fig. 1, items 100-103), the method comprising:

selecting a tightly coupled thread group from among the threads (related threads within a thread group) based on coupling attribute information indicative of a coupling attribute between the threads, the tightly coupled thread group including a set of tightly coupled threads running in

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cooperation with each other (col. 2, lines 60-67, col. 3, lines 5-18, Fig. 4 items 401-402, col. 4, lines 23-29, col. 6, lines 31-58).

5. Alfieri does not expressly teach performing a scheduling operation of dispatching the tightly coupled threads to several of the processors that are equal in number to the tightly coupled threads to simultaneously execute the tightly coupled threads by the several of the processors. However, Strout teaches a multiprocessor computer system that can execute simultaneously as multiple threads are each scheduled and dispatched, by the operating system, to a dedicated plurality of processors (see Fig. 1, Abstract, col. 1, lines 34-55, col. 5, line 37, col. 7, lines 10-15). Alfieri and Strout are analogous art because they are both in the same field of endeavor of thread/process scheduling on a multiprocessor and both attempting to solve the same problem of improving the processing performance within its multiprocessor system (see Abstracts of both Alfieri and Strout). Therefore, one of ordinary skill in the art would have known to modify Alfieri's multiprocessing computer system, utilizing its tightly coupled threads, such that it performs a scheduling operation of dispatching the tightly coupled threads to several of the processors that are equal in number to the tightly coupled threads to simultaneously execute the tightly coupled threads by the several of the processors, as taught in the reference of Strout. The suggestion/motivation for doing so would have been to provide the predicted result of improving efficiency and processing performance by allowing for parallel execution (see Abstract, col. 1, lines 34-55, col. 5, lines 1-7).

6. Alfieri (col. 5, lines 53-62) and Strout (col. 5, lines 37-45, col. 1, lines 52-55) do teach wherein performing the scheduling operation includes reserving an execution term of each of the

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several of the processors. However, Alfieri and Strout do not expressly disclose that the reserved execution terms have the same execution start timing and the same term.

7. But Saito teaches cooperative execution of a plurality of programs involving reserving an execution term having the same start time and the same period (see Abstract, col. 15, lines 11-15). One of ordinary skill in the art would have known to modify Alfieri in view of Strout processing system such that it would include the feature of Saito's processing system, namely, that the reserved execution terms have the same execution start timing and the same term. The suggestion/motivation for doing so would have been to provide the predicted result of improving synchronization by allowing for timing constraints and from improved coordination (see Abstract, col. 1, lines 66-67, col. 2, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art to combine Alfieri, Strout, and Saito to obtain the invention of claim 1.

8. As to claim 4, Alfieri teaches wherein each of the tightly coupled threads has context information indicating contents of a local memory (local cache 108) of one of the several of the processors (Fig. 1, col. 6, lines 21-23, Abstract). Alfieri does not explicitly teach wherein each of the tightly coupled threads has context information indicating contents of a register of one of the several of the processors. However, Strout teaches the limitation of "wherein each of the tightly coupled threads has context information indicating contents of a register" (Fig. 1, col. 3, lines 47-52, col. 5, lines 9-14 col. 7, lines 22-38). Strout discloses and suggests that processor 1 utilizes Global Registers 15 to store context information for executing process 1/thread 1 of Program A 10, for example, and that a process contains register context and process tables

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associated with the program that can be scheduled for execution (Fig. 1 above; also see col. 7, lines 5-15 and 22-38; col. 8, lines 9-11). One of ordinary skill in the art would have known to modify Alfieri such that it would include the feature of wherein each of the tightly coupled threads has context information indicating contents of a register, as suggested in Strout. The suggestion/motivation for doing so would have been to provide the predicted result of utilizing a faster memory. Alfieri teaches using RAM shared memory 120 in addition to the local cache 108 (col. 2, lines 55-59). Strout teaches utilizing Global Registers as shared memory (col. 7, lines 22-24). Registers are faster memory than RAM, and therefore, it would be desirable to modify Alfieri with the teachings of Strout to obtain the invention of claim 4.

9. As to claim 6, Strout teaches wherein the scheduling operation is performed by an operating system executed by one of said plurality of processors (col. 5, lines 37-45, col. 1, lines 52-55).

10. As to claim 9, it is rejected for the same reasons as stated in the rejection of claim 1.

11. As to claim 15, it is rejected for the same reasons as stated in the rejection of claim 1. In addition, Alfieri's system contains a computer-readable media that stores the instructions to perform the method of claim 1 (col. 2, lines 53-54).

12. Claims 2, 10, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri (US 5,745,778) in view of Strout, II et al. (hereinafter Strout) (US 5,339,415) in view of Saito et al. (hereinafter Saito) (US 5,887,143), and further in view of Day et al. (hereinafter Day) (US 2004/0249995 A1).

13. As to claim 2, Alfieri in view of Strout teaches a computer having a memory system, wherein each of said plurality of processors includes a local memory and a group of tightly coupled threads is executed (see Alfieri, col. 2, lines 43-54 and 60-67). Alfieri in view of Strout's computer system is explicitly silent in mapping the local memory of one of the several of the processors, which executes one of the tightly coupled threads, in part of an effective address space of other one of the tightly coupled threads executed by other one of the several of the processors. However, Day discloses a multiprocessor system utilizing conventional/well-known virtual memory schemes with management for its memory such that the local memory of the processors is mapped to an effective address space of a different thread executed by a different processor (page 2, [0017], lines 3-8, and see claim 24). The effective address space is utilized by both its first processor and its second processor. One of ordinary skill in the art would have known to modify the memory component of Alfieri in view of Strout, and further in view of Saito's multiprocessor system such that it would include the memory management features of Day's multiprocessor system, specifically, mapping the local memory of one of the several of the processors to an effective address space of other one of the tightly coupled threads executed by other one of the several of the processors. The suggestion/motivation for doing so

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would have been to provide the predicted result of improving memory management in the multiprocessing system by allowing for cooperation and/or for providing the capability to support full virtual memory semantics, as taught in Day (page 1, last line of [0005], and [0008], and [0016]). Therefore, it would have been obvious to one of ordinary skill in the art to combine Alfieri, Strout, Saito and Day to obtain the invention of claim 2.

14. As to claim 10, it is rejected for the same reasons as stated in the rejection of claim 2.

15. As to claim 16, it is rejected for the same reasons as stated in the rejection of claim 2.

Allowable Subject Matter

16. Claims 5 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

17. Applicant's amendment of the Title resulted in the withdrawal of the objection by the Examiner.

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18. Applicant's filing of the approved Terminal Disclaimer has overcome the double patenting rejections, and therefore, the Examiner has withdrawn those rejections.

19. *Applicant argues in the Remarks that the cited prior art do not teach the claims as newly amended.*

In response, the newly amended claims prompted the new grounds of rejections, which render the arguments moot.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH TANG whose telephone number is (571)272-3772.

The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/
Supervisory Patent Examiner, Art Unit 2195

/Kenneth Tang/
Examiner, Art Unit 2195